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Ips Bark Beetles in the South

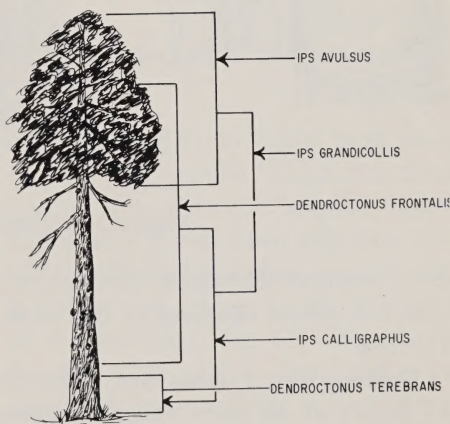
Charles F. Speers¹

In the South, *Ips* beetles cause the death of thousands of trees and the loss of over 100 million board feet of pine each year. They normally breed in cut branches, logs, pulpwood, or in weakened and dying pines. *Ips* may attack only the tops and limbs of larger trees infested by other bark beetles, or they may infest the entire tree (fig. 1). When the vagaries of weather, such as hurricanes, ice, hail, or blowdown, cause tree damage, losses of healthy trees to *Ips* increase. Killing is also greater following logging, fires, and, particularly, abnormally dry weather. During drought periods, healthy as well as poor-risk trees are killed, and groups as well as single trees quickly succumb to rapidly expanding beetle populations.

Evidence of Attack

The first signs of injury are boring particles in bark crevices and white- to red-colored exudations called "pitch tubes" projecting from the bark (fig. 2).

These tubes consist of a combination of bark particles and gum which the adults push out of the galleries. By closely examining the tubes, one can locate the tiny central hole where the beetles enter the tree. If the bark is removed, the adult galleries and larval tunnels may be seen in the inner bark surface. If a tree is in a seriously weakened condition, or if large numbers of beetles attack during a short period of time, the only evidence of beetle activity may be



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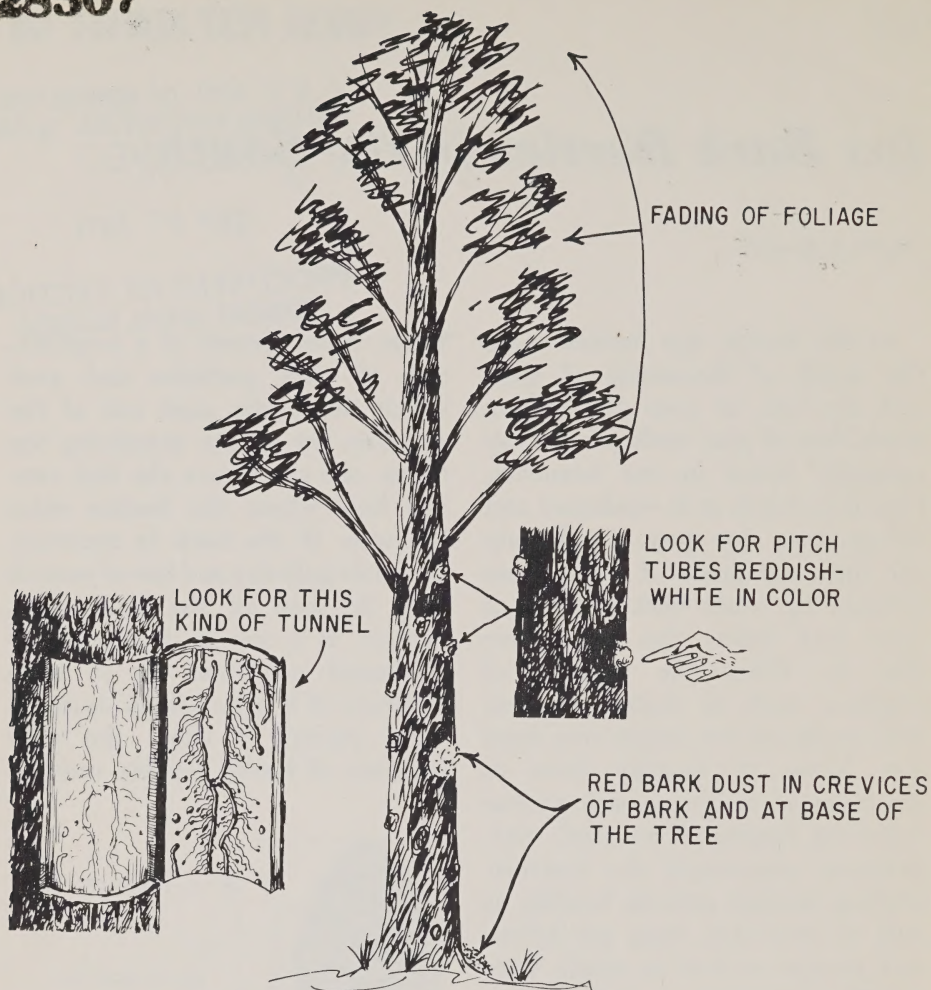
Figure 1.—Species of *Ips* may attack separately, at the same time, or in conjunction with other bark beetles.

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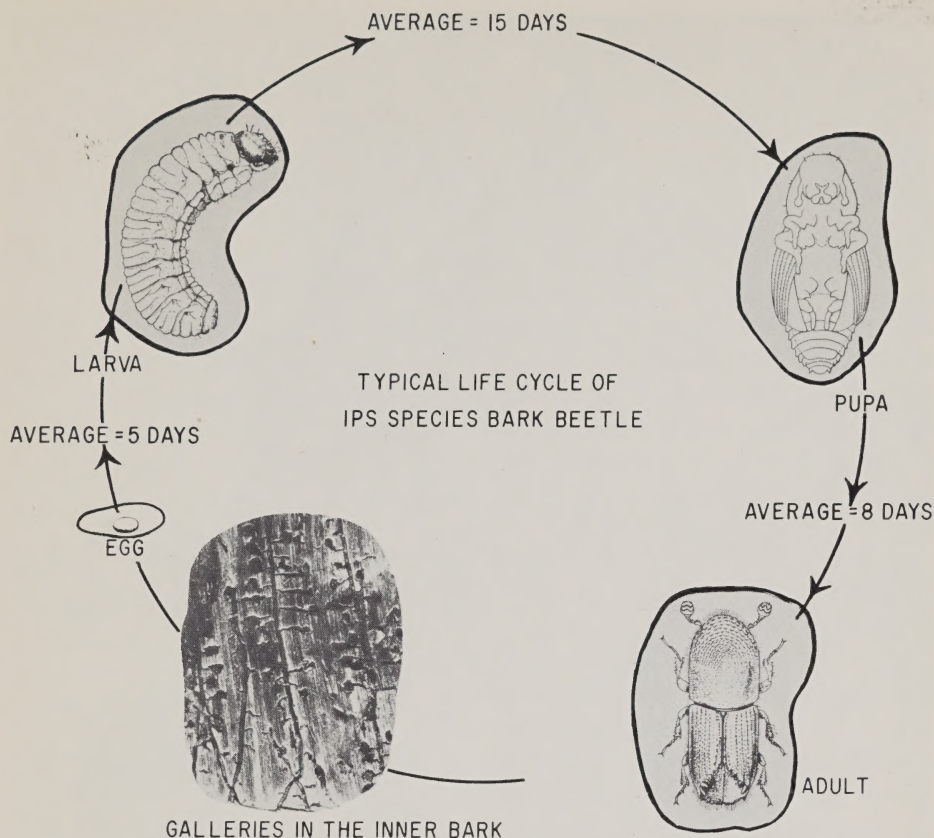
Figure 2.—Symptoms of Ips attack.

the presence of reddish bark particles and white sawdust in the bark crevices.

Beetle-injured trees are difficult to detect at an early stage because the pitch tubes are often inconspicuous. The first symptom easily observed is a change in the foliage color from dark to faded green. During the summer, this initial fading may not occur until 3 or 4 weeks after the beetles have entered the tree. If trees are infested

in late fall, they may remain green all winter and fade after insect emergence the following spring. In most instances, beetles have completed development and emerged by the time discoloration is spotted.

The best way to make sure a tree has bark beetles is to remove a piece of bark and examine it. Ips makes a gallery pattern consisting of a central nuptial chamber from which two or more egg galleries radiate. These are generally clean



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Figure 3.—Typical life cycle of *Ips*. Note nature of the gallery pattern engraved on the inner bark surface.

of dust and often extend with the grain of the wood. The larval galleries in the bark extend at right angles to the egg galleries and often score the surface of the wood (fig. 3). Because of this characteristic pattern on the wood, *Ips* are often called "engraver beetles." If the outer bark appears to be peppered with "shot holes," with no resin around the holes, the new brood of adults has already emerged (fig. 4).

Description of Stages

The three species of *Ips* commonly occurring in the South are brownish-black to black and can be

distinguished from other bark beetles by the peculiar shape of their bodies. The rear end appears truncated as if it had been abruptly cut off, is hollowed out above, and bears a number of spines on the margins of the declivity (fig. 5). Other bark beetles with which *Ips* might be confused have neither spines nor a posterior declivity on the wing covers.

The eggs, larvae, and pupae of each species are similar in appearance but vary in size. The eggs are oval and pearly white, and they are deposited in individual niches along the sides of the egg gallery. The

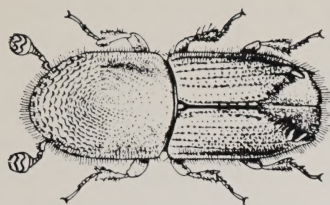


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Figure 4.—Exit holes of adults make outer bark appear to be peppered with “shot holes.”

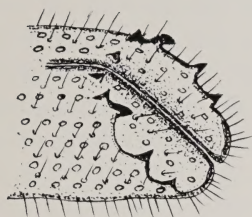
larvae are white, slightly curved grubs, with reddish-brown heads. They mine in individual tunnels within the inner phloem. The pupae are creamy white and the same size as the adults.

Ips calligraphus is the largest species in the genus found in the South. It is a stout, brown to black cylindrical beetle, about $\frac{1}{4}$ of an inch long, with six prominent teeth on each side of the declivity.



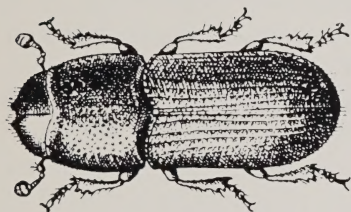
A

IPS SPECIES



B

DECLIVITY OF IPS



C

SOUTHERN PINE BEETLE

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Figure 5.—(A) Rear end of *Ips* appears truncated as if it has been abruptly cut off and is hollowed out above. (B) The declivity bears a number of spines along the margin. (C) Other bark beetles with which it might be confused are not hollowed out and have rounded wing covers at the rear end.

Ips grandicollis is a medium-sized *Ips* about $\frac{1}{8}$ of an inch long with five teeth on each side of the declivity.

Ips avulsus is the smallest of the three *Ips* and is about $\frac{1}{16}$ of an inch long with four teeth on each side of the declivity.

Life History

Beetles in various stages of development overwinter beneath the bark of infested wood. In the warmer parts of the South, beetles are active even in winter when the weather is mild. Adults fly to all species of pines and bore through the bark to establish their egg galleries. These galleries vary in number, depending on the number of females attracted to each male. As galleries are extended, the eggs are deposited in niches along the sides. The eggs hatch in about 7 days and larvae tunnel in the inner bark. The larval period may vary from 2 weeks in the summer to several months in the winter. At the end of this period, larvae form a cell at the end of their gallery and pupate.

Pupae remain in a resting stage for about a week. They then transform into beetles and feed on the inner bark before emerging through holes in the bark similar to those by which their parents entered. Because only 18 to 40 days are required for the development of each generation, each year several generations of beetles occur in North Carolina and as many as 12 generations of *Ips avulsus* occur along the Gulf Coast. This short life cycle allows *Ips* populations to build up very rapidly when conditions are favorable for brood development.

Natural Control

Beetle populations are generally kept in partial balance by predators, parasites, birds, and natural mortality. When the balance is upset and *Ips* populations suddenly in-

crease several fold, these biological controls cannot adjust quickly enough to maintain stability.

Indirect Control

Fresh cuttings or damaged trees attract large numbers of beetles. The insects may then attack standing trees as well as slash. This attraction can be minimized by following certain procedures:

1. Cut low stumps and utilize the tops of trees as completely as possible. When tops cannot be used, lop and scatter them so they will dry out rapidly.

2. Move cut wood from the stand as rapidly as possible. Wood remaining in a stand more than a week may attract enough beetles to completely occupy it and overflow into nearby standing trees.

3. On large logging operations, cut continuously rather than intermittently so that fresh slash is always available for beetles to move from old to new cuttings.

4. Minimize cutting during drought periods. Beetle attacks are more serious during dry periods when the trees are in a condition of stress.

5. Peel pine fence posts in open areas rather than in woods. This type of operation is a strong attractant for bark beetles.

6. Do not accumulate slash and cut wood or pile green lumber near living trees.

7. Avoid bruising or injuring trees as much as possible during felling, skidding, and home construction.

8. Do not run heavy equipment close to trees which are not to be cut, either in the woods or around home sites, because soil compaction

and root injury may be serious enough to cause the trees to be attacked.

9. Keep shade trees in a healthy condition by adequate fertilization and watering. These measures are particularly important during drought periods.

Direct Control

When the amount of timber involved is small, peeling of the bark to expose and kill the developing brood will provide a good method of control. The debarking or chipping of slabs of infested trees will also help to reduce insect populations.

Logs, pulpwood, and large limbs which cannot be utilized promptly should be sprayed thoroughly with an emulsion containing one-quarter percent benzene hexachloride (BHC). This emulsion is made by adding 1 pint of 11-percent BHC-E to 6 gallons of water. Wet the bark thoroughly by applying at least 1 gallon of emulsion per 100 square feet of bark surface. Such treatment will control insects which have already entered the bark and prevent additional attack for several months.

CAUTION: Insecticides are poisonous to man and animals. Follow closely the directions and precautions on the container label. Handle with care. Special caution is required when using concentrates: wear rubber gloves and avoid contact with eyes, nose, and mouth. After mixing chemicals or spraying, wash exposed body surfaces with soap and water. Change clothing if spray has been spilled on it. Store chemicals in plainly labeled containers out of reach of children and destroy used containers. Improper

use of insecticides or careless disposal of unused portions may be injurious to humans, domestic animals, plants, beneficial insects, fish, and wildlife. Also, it may contaminate water supplies.

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